

## **Bilayered Materials Wearable Electronics**

BCMmaterials, Basque Center for Materials, Applications and Nanostructures, UPV/EHU

Science Park, 48940 Leioa, Spain

IKERBASQUE, Basque Foundation for Science, 48009 Bilbao, Spain

*e-mail:* senentxu.lanceros@bcmaterials.net

### **Abstract**

Graphene and bilayered materials represent one of the most interesting materials for a wide variety of wearable electronic solutions, in particular in the area of sensors and actuators, by developing a new generation of smart and functional materials.

Smart and functional materials offer large application potential in areas such as sensors and actuators, energy generation and storage, among others. The successful development of applications rely both in the ability to properly tailor their functional properties and in their integration with suitable fabrication technologies.

In this sense, polymer nanocomposite based smart materials and printable smart materials is an area of increasing interest due to low-cost fabrication, simple integration into devices and possibility of obtaining multifunctional materials over large and flexible areas.

In this talk, an overview of the historical evolution of the use of materials and their relation with the latest technology developments will be provided. Further, some relevant results, strategies and challenges in the development of smart and functional materials based on graphene and bilayered materials, such as conductive and piezoresistive ones will be shown, together with some of their most interesting applications. Finally, critical challenges and future research directions will be indicated.

### **Acknowledgements**

Spanish Ministry of Economy and Competitiveness (MINECO) through the project MAT2016-76039-C4-3-R (AEI/FEDER, UE). Basque Government Industry and Education Department under the ELKARTEK, HAZITEK and PIBA (PIBA-2018-06) programs, respectively. European Union's Horizon 2020 Programme for Research, ICT-02-2018 - Flexible and

Wearable Electronics. Grant agreement no. 824339 - WEARPLEX is also acknowledged. Portuguese Foundation for Science and Technology (FCT): UID/FIS/04650/2019, PTDC/BTM-MAT/28237/2017; PTDC/EMD-EMD/28159/2017, PTDC/FIS-MAC/28157/2017